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The observatory of the Urania will be furnished with a number of small instruments; but, in addition to these, it will have the most powerful telescope of Berlin. The lens of the great refractor will be twelve inches in diameter, while the length of the telescope is to be five metres. The dome is eight metres in diameter.

The establishment of this grand institute marks a new departure in the methods of popularizing the natural sciences, and its influence cannot fail to be wholesome. It will educate the masses to an intelligent observation of natural phenomena.

SCIENTIFIC NEWS IN WASHINGTON.

Irrigation in California. — The Nucleus of a "Zoo." — Mounds of Ohio. — Triple Births in the Human Race. — The Talking-Machine in Use. — Where Will It Go Next?

Irrigation in California.

MR. WILLIAM HAMMOND HALL, State engineer of California, addressed the National Geographic Society on Friday evening last, on irrigation, particularly irrigation operations in California. It appears that the first work of this kind within the State, subsequent to that of the early mission fathers, was undertaken by a band of Mormons in the San Bernardino valley, in 1852.

Of the total area of California perhaps one-third is susceptible of sufficient cultivation to sustain a moderately dense population without the aid of irrigation, while one-third will not sustain a sparse population without the aid of irrigation. The principal regions of irrigation in the State are the great interior valley, the southern valley, and the coast plain of the south. By a comparison of the relative amount of rainfall in the older countries of Europe with that of California, and from the peculiar character of the soil, Mr. Hall showed that the relative necessity for the artificial application of water is far greater in California than in these countries, the annual rainfall being much less, and the character of the soil and rate of evaporation quite as unfavorable.

There are in California about 750,000 to 800,000 acres actually irrigated each year, representing what would ordinarily be called an irrigation area of 1,200,000 acres, and there are reasonably within reach of existing canals 2,500,000 acres. The methods of applying water differ very widely with the differing conditions in the various irrigable areas. Much has been done by individual effort in regions where the problem of diverting water from the streams is comparatively easy; but there remain a large number of streams presenting difficult problems, the waters of which can only be utilized by the expenditure of immense capital and the operation of extensive works. Land values in the valley have increased from \$1.25 per acre, prior to the introduction of irrigation, up to \$250 and even higher values, merely by having water rights attached. Much is expected from the investigations on this subject which Congress has recently authorized to be prosecuted.

The Nucleus of a "Zoo."

The Department of Living Animals at the National Museum attracts greater crowds of visitors than can find comfortable standing-room in the animal building, and furnishes one of the strongest arguments that could be made on the necessity of a great national zoological garden. Gifts and deposits have been coming in in such number, that the museum authorities have found it necessary to decline a number of valuable objects, such as a lioness, aoudad, black leopard, camel, and ostrich, because the institution is positively unable to provide for their accommodation. The total number of live animals, birds, and reptiles received up to date is 281. One of the latest arrivals is a great rarity, a Rocky Mountain sheep from north-western Montana, the gift of Mr. George Bird Grinnell, editor of *Forest and Stream*. It has attracted thousands of visitors, and is at present in fine condition. So far as known, it is the only specimen of the species now alive in captivity.

Mounds of Ohio.

At the instance of Dr. Cyrus Thomas, Mr. Reynolds of the Bureau of Ethnology has recently conducted an exploration of one of the most interesting mounds in Ohio; namely, the truncated pyramid associated with the system of enclosures opposite Bourne-

ville, in the Point Creek valley. These enclosures belong to the type comprising true circles and equilateral squares. It proved to be a burial-mound in which two series of circular upright palings, thirty-six feet in diameter, constituted a pre-eminent feature. These indicated successive erection and use, as the mound was from time to time enlarged. The skeletons found were all interred systematically within these wooden palings upon the different sand-seams at different depths. The burials were evidently successive or periodical. None of them could have been intrusive, since the stratification above them was not disturbed. Many interesting specimens, comprising pottery, stone pipes, shell beads, and grooved bone implements, were found deposited with the various skeletons. These and other features that were observed, will, it is said, prove eminently helpful in the solution of the questions relative to the age and builders of these interesting works.

Triple Births in the Human Race.

Some interesting data respecting the frequency of triplets in the human race are being collected and elaborated by Dr. B. Ornstein, late surgeon-general of the Greek army. While on an inspection tour through western Greece, he discovered the fact that triplets are more frequently found there than in any other portion of that kingdom. Great difficulty is experienced, however, respecting information as to the age reached by either or all of the children.

It is desirable therefore, for the purpose of careful study of this subject, to gather information based upon the following: viz., (1) all well-authenticated instances of triple births, and in how many of them the three children reached the age of two (or more) years; (2) the number of cases in which two of the triplets survive one year, or longer, or in which one of them reached the age of one year or more.

Any information pertaining to this subject will be gratefully received by Dr. Ornstein, Athens, Greece; or communications will be forwarded if sent to Dr. W. J. Hoffman, Bureau of Ethnology, Washington, D.C.

The Talking-Machine in Use.

The Geological Survey is the first of the government offices to adopt the graphophone for service. Major Powell is supplied with one of these wonderful little listening and talking machines, and he takes it home with him, and talks to it as the necessity arises or an idea strikes him. In his absence an intelligent boy or girl can evoke a repetition of his monologue, and commit it to paper.

Where Will It Go Next?

The apparatus of the Life-Saving Service which has attracted such deep interest in the Cincinnati Exposition is home again, and safely under shelter. Mr. S. I. Kimball, in charge of the bureau, does not wish to return it to the bare and distant loft of the Treasury Department, where for many years it has been an object of curiosity to visitors, but will await the assignment to it of convenient quarters, where the property can be properly protected.

BOOK-REVIEWS.

The Teachers' Psychology. By A. S. WELCH. New York, E. L. Kellogg & Co. 12°. \$1.25.

THIS work consists of two distinct parts, the first being a treatise on the intellectual faculties, and the second an essay on the proper method of educating them. The author begins with a general view of the mind as a whole, with its three functions of thought, feeling, and action, but afterwards confines himself to the operations of the intellect. This psychological part of the book cannot be pronounced very successful. Mr. Welch's philosophical standpoint seems to be that of the Scottish school; but he cannot be compared with the standard authors of that school in his method of treatment. He takes a surface view of his subject, and, besides, is often lacking in accuracy. Thus, the term "concept," which has always been used to denote a general idea, is employed in this work for both general and particular ideas. Mr. Welch's view of memory is also peculiar, for he includes in it the act of acquiring knowledge as well as the acts of retaining and recalling it. The second part of the work is of a better character, and lays down

certain principles of education to which little exception can be taken. The author holds that education ought to conform to the course of mental development, each study being introduced at the time when the mind is best fitted to pursue it, and hence that studies requiring a high degree of abstraction and close reasoning should not be taken up until after the simpler and more concrete subjects have been mastered. He gives some examples of wrong arrangement of studies, and some suggestions as to the proper mode of teaching certain branches; and, though there is nothing new in his theories, teachers may find his presentation of them worth examining.

AMONG THE PUBLISHERS.

IN the February *Wide Awake*, "Forty-eight Hours a Day" will interest all astronomically minded young folk, and their elders as well; "An Old-fashioned Boat" is an interesting chapter in the progress of invention, by Ernest Ingersoll; Mrs. Sallie Joy White, in her chapter on "The Use of the Oven," tells how potatoes are baked in the Boston public schools; Mrs. Goddard Orpen gives the history of the famous Spanish crown pearl, the *Pelegrina*; and Professor Starr, in his geological series, describes some of the gnawings of "The Tooth of Time."

— P. Blakiston, Son, & Co., of Philadelphia, have just ready "A Text-Book of Operative Dentistry," by Professor Thomas Fillebrown of the Harvard Dental School, and a second edition of "A Handbook of Diagnosis and Treatment of Skin Diseases," by Dr. Arthur Van Harlingen. They have nearly ready "A Surgical Handbook," by Professor F. Mitchell Caird and Dr. C. Walker Cathcart, of the University of Edinburgh, thoroughly illustrated, and printed in a convenient shape for carrying about.

— W. H. Lowdermilk & Co. will publish in the course of a week "Matthew's Guide for Settlers upon Public Lands of the United States," intended for all having business before the district land office and the Department of the Interior. It is prefaced by a map of the United States, showing the thirteen original States, with the territory subsequently acquired, giving dates and sources of acquisition and the various State and territorial laws regarding real property, and how under United States laws it may be acquired. The author was late assistant chief of the preëmption division, General Land Office.

— G. P. Putnam's Sons announce among their earlier publications for 1889 the following: the first volume of the letter-press edition of "The Writings of Washington," edited by Worthington C. Ford, which will be uniform with the previously published sets of "Hamilton" and "Franklin," and be completed in fourteen volumes, limited to 750 sets; a second edition, revised and enlarged, of "The Best Books: a Reader's Guide to the Choice of the Best Available Books in All Departments of Literature, down to 1888," compiled by William Swan Sonnenschein; and "English Wayfaring Life in the Middle Ages" (fourteenth century), by J. J. Jusserand, translated from the French by Lucy Toulmin Smith. The author has supervised the translation, and has added about a third of new matter, so that the volume differs materially from "La Vie Nomade." The original work was published without illustrations, while this English edition, which is issued in London by T. Fisher Unwin, will be elaborately illustrated from a number of rare designs that have not previously come into publication. Besides these, they announce "A Manual of Oriental Antiquities," including the architecture, sculpture, and industrial arts of Chaldea, Assyria, Persia, Judea, Phœnicia, and Carthage, by Ernest Babelon, librarian of the Department of Medals and Antiquities in the Bibliothèque Nationale of Paris, translated and enlarged by B. T. A. Evetts of the Department of Egyptian and Assyrian Antiquities of the British Museum, with 250 illustrations; "From Japan to Granada: Sketches of Observation and Inquiry in a Tour round the World in 1887-88," by James Henry Chapin, D.D.; "Business," a practical treatise, by James Platt, reprinted, under arrangement with the author, from the 75th English edition; in the Knickerbocker Nuggets, "Ancient Spanish Ballads," historic and romantic, translated, with notes, by J. G. Lockhart, with sixty illustrations by Allan, Roberts, Harvey, and others, and "The Wit and Wisdom of Sydney Smith;" and in the Questions of the Day

Series, "Outlines of a New Science, a Study of Industrial Conditions," by E. J. Donnell; "Politics as a Duty and as a Career," by Moorfield Storey; "The Plantation Negro as a Freeman," observations upon his character, conditions, and prospects in Virginia, by Philip A. Bruce.

— D. Lothrop Company will publish shortly a story by a New York lady which is said to be a refutation of much of "Robert Elsmere;" and a volume of stories by H. H. Boyesen, called "Vagabond Tales."

— T. Y. Crowell & Co. have in preparation, for the use of schools, an abridged translation of Duruy's admirable "Histoire de France," under the charge of Professor J. F. Jameson of Brown University. They announce for early publication Bourrienne's "Mémoires of Napoleon Bonaparte" in four volumes. They will be handsomely illustrated, and will contain all the critical and biographical and historical notes which add so much to the value of the latest English edition.

— D. Appleton & Co. announce for this week, "Nature and Man," a series of essays, scientific and philosophical, by the late William Benjamin Carpenter, with an introductory memoir by J. Estlin Carpenter, and a portrait of the writer of the essays. The volume also includes a few passages from Dr. Carpenter's earlier writings, prefixed to illustrate the prior stages of his great labors for physiological psychology.

— Henry Holt & Co. will publish shortly a book on the American Revolution, which will furnish not only novel but highly curious matter. In his researches among the French archives, Mr. John Durand, the translator of M. Taine's "French Revolution," found many documents relating to the United States which were of the greatest interest. These papers have been translated by Mr. Durand for the first time, and are edited by him. The work will throw light on various episodes of the American Revolution as well as on the characters of the men who took part in it. The peculiar rôle played by Beaumarchais, the cabal against Washington and Franklin, the secret sessions of the Continental Congress, of which no detailed account has come down to us, together with the social aspects of the country while the Revolution was in progress, will all be presented.

— Harper & Brothers have just published a volume on "The Government of the United States," by W. J. Cocker, A.M., primarily intended as a text-book for public schools, but also calculated to serve as a clear and concise reference manual upon the Constitution. The author presents the influences and conditions which rendered the Constitution a necessity, and describes the powers and limitations of our form of government. The numerous references to more extensive works on the subject make the book a valuable guide in prosecuting further a study of our institutions. Three other books also just ready are: "Modern Science in Bible Lands," by Sir J. W. Dawson, which presents a study of such points of the geology and physical features of Italy, Egypt, and Syria as might throw light on their ancient history, and especially upon the history of the sacred scriptures; "Our English," by Professor Adam S. Hill, which contains novel and sensible suggestions for the proper teaching of the language in schools and colleges, and reviews "Newspaper English," "English in the Novel," "Pulpit English," and "Colloquial English;" also an edition in book form of Charles Reade's "Bible Characters."

— The two latest issues of the *Forum* contain articles by ex-President Andrew D. White of Cornell, on the need of new universities in this country, and particularly on the project for a great central university at Washington. In the January number the writer speaks of the present position of the higher education in America, and of the rapidly increasing demands on the existing universities. He notes the fact that a process of separation is in progress among our institutions of learning, and that a few of them are developing into real universities, while the remainder are tending to become intermediate colleges, holding a position between the universities and the public schools. Real university instruction, he maintains, can only be given in large and liberally endowed institutions, and he believes that we need one or two such institutions of a higher order than any we now have. The most suitable